Project Introduction

The General Mission Analysis Tool (GMAT) is a state of the art spacecraft mission design tool under active development at NASA's Goddard Space Flight Center (GSFC). GMAT is an open source project, periodically releasing code on publicly accessible repositories. The tool has recently been operationally certified for use planning maneuvers for the Advanced Composition Explorer (ACE). The current implementation of GMAT is built on an architecture that was originally designed to support multiple parallel runs of space flight problems on a distributed processing platform. The implementation of GMAT, to date, has not exercised the features of the design that make parallel processing available to users. The GMAT program in its current implementation runs on a single execution thread on modern computer systems, even when those systems contain multiple processing cores that allow for parallel execution of operations. Thinking Systems is equipped to undertake the task of coding components that plug into GMAT's base code libraries in order to produce an efficient parallelization of GMAT's capabilities. The parallelization of GMAT will be built by building replacement elements of several components of GMAT's core control engine and by implementing user scriptable elements that capitalize on these core components to provide processing on multiple threads simultaneously. Thinking Systems will construct these components in a way that allows the parallel processing engine to run using GMAT's core library code. The parallel engine will be built to work alongside existing GMAT code, and will be accessed using a separate user interface tailored to the parallel engine. Examples of the types of problems that benefit from the proposed system are Parametric studies using systematic changes in one or more parameters, Monte Carlo analysis problems, Large scale targeting problems, and Dispersion analysis studies
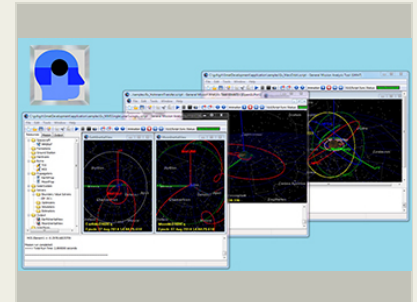
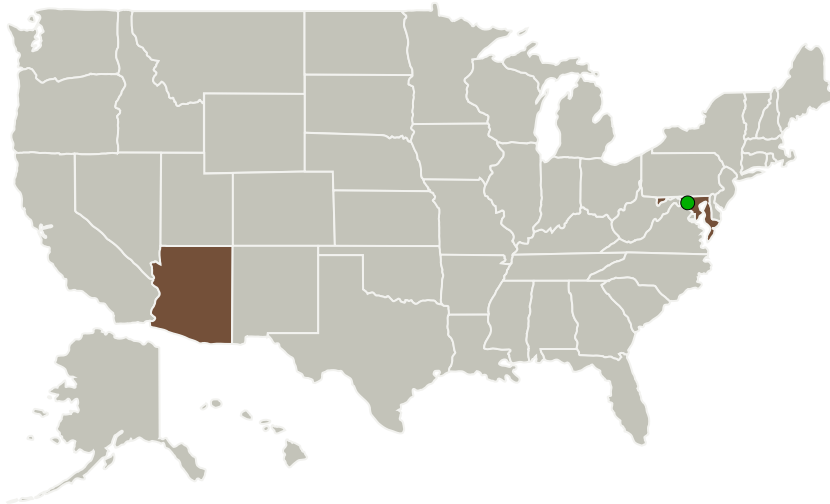Parallel Enhancements of the General Mission Analysis Tool Project Image

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For more information and an accessible alternative, please visit:
https://techport.nasa.gov/view/17827

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Primary U.S. Work Locations and Key Partners

Organizations Performing Work	Role	Type	Location
Thinking Systems, Inc	Lead Organization	Industry	
🟢 Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Arizona	Maryland

Project Transitions

▶ **June 2014:** Project Start

✔ **December 2014:** Closed out

Closeout Documentation:
- Final Summary Chart(*https://techport.nasa.gov/file/137488*)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Thinking Systems, Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
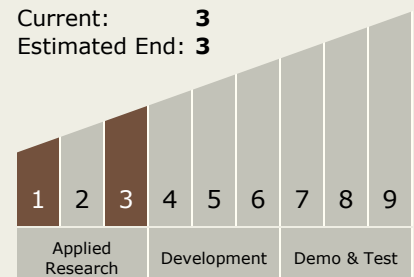
Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Darrel J Conway

Technology Maturity (TRL)

Start: **1**
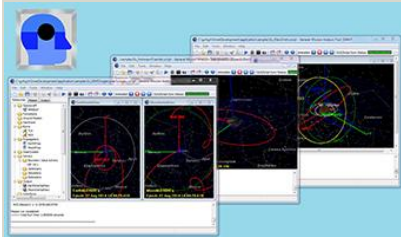Current: **3**
Estimated End: **3**

1	2	3	4	5	6	7	8	9
Applied Research			Development			Demo & Test		

Images

Project Image
Parallel Enhancements of the
General Mission Analysis Tool
Project Image
*(https://techport.nasa.gov/imag
e/127935)*

Technology Areas

Primary:

- TX11 Software, Modeling,
  Simulation, and Information
  Processing
  └ TX11.2 Modeling
      └ TX11.2.1 Software
          Modeling and Model
          Checking

Target Destinations

The Sun, Earth, The Moon,
Mars, Others Inside the Solar
System, Outside the Solar
System